	Application No.	Applicant(s)	
Notice of Allowability	10/615,284	HESS ET AL.	
	Examiner	**Art Unit**	
	Edward Raymond	2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to _Application filed 7/8/03_.

2. ☒ The allowed claim(s) is/are _1-16_.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☒ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

    Paper No./Mail Date _____ .

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☐ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

DETAILED ACTION

Drawings

1.   New corrected drawings in compliance with 37 CFR 1.121(d) are required in this

application because the thickness of the lines and characters are not consistent.

Applicant is advised to employ the services of a competent patent draftsperson outside

the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings.

The corrected drawings are required in reply to the Office action to avoid abandonment

of the application. The requirement for corrected drawings will not be held in abeyance.

Allowable Subject Matter

2.   **Claims 1-16** are allowed.

3.   The following is an examiner's statement of reasons for allowance: DiFoggio et

al. teach a downhole PV tests for bubble point pressure. The prior art of record does

not teach a method for calculating the compressibility factors of a mixture using the

cubic equation of state (CEOS), the mixture having a liquid region, the method

comprising: a) calculating a pure liquid compressibility factor when the compressibility

factor is in the liquid region; b) using the second virial coefficient of the CEOS to

determine from the pure liquid compressibility factor a vapor compressibility factor

extensible in the liquid region; and c) accepting the higher of the pure liquid

compressibility factor or the vapor compressibility factor extensible in the liquid region.

         The prior art of record does not teach method for calculating the compressibility

factors of a mixture using the cubic equation of state (CEOS), the mixture having a

vapor-liquid equilibrium region, the method comprising: a) determining that the

compressibility factor is in the vapor-liquid equilibrium region; b) calculating when the compressibility factor is in the vapor-liquid equilibrium region a pure liquid compressibility factor; c) using the virial coefficients of the CEOS and the pure liquid compressibility factor calculated when the compressibility factor is in the vapor-liquid equilibrium region to determine a vapor compressibility factor in the vapor-liquid equilibrium region; and d) accepting the higher of the pure liquid compressibility factor calculated when the compressibility factor is in the vapor-liquid equilibrium region or the vapor compressibility factor calculated in the vapor-liquid equilibrium region.

The prior art of record does not teach a method for calculating the compressibility factors of a mixture using the cubic equation of state (CEOS), the mixture having a liquid region and a vapor-liquid equilibrium region, the method comprising: determining that the compressibility factor is either in the liquid region or in the vapor-liquid equilibrium region; the method when the compressibility factor is in the liquid region comprising: calculating a pure liquid compressibility factor; using the second virial coefficient of the CEOS to determine from the pure liquid compressibility factor a vapor compressibility factor extensible in the liquid region; and accepting the higher of the pure liquid compressibility factor or the vapor compressibility factor extensible in the liquid region; the method when the compressibility factor is in the liquid region comprising: calculating a pure liquid compressibility factor; using the virial coefficients of the CEOS and the pure liquid compressibility factor to determine a vapor compressibility factor in the vapor-liquid equilibrium region; and accepting the higher of the pure liquid

compressibility factor or the vapor compressibility factor calculated in the vapor-liquid equilibrium region.

The prior art of record does not teach a method for calculating the compressibility factors of a mixture using the cubic equation of state (CEOS), the mixture having a liquid region and a vapor-liquid equilibrium region, the method comprising: a) calculating a pure liquid compressibility factor when the compressibility factor is in the liquid region; b) using the second virial coefficient of the CEOS to determine from the pure liquid compressibilit3 factor a vapor compressibility factor extensible in the liquid region; and c) accepting the higher of the pure liquid compressibility factor or the vapor compressibility factor extensible in the liquid region; d) calculating a pure liquid compressibility factor for the vapor-liquid equilibrium region; e) using the virial coefficients of the CEOS an the pure liquid compressibility factor calculated for the vapor-liquid equilibrium region to determine a vapor compressibility factor in the vapor-liquid equilibrium region; and f) accepting the higher of the pure liquid compressibility factor calculated for the vapor-liquid equilibrium region or the vapor compressibility factor calculated in the vapor-liquid equilibrium region.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."
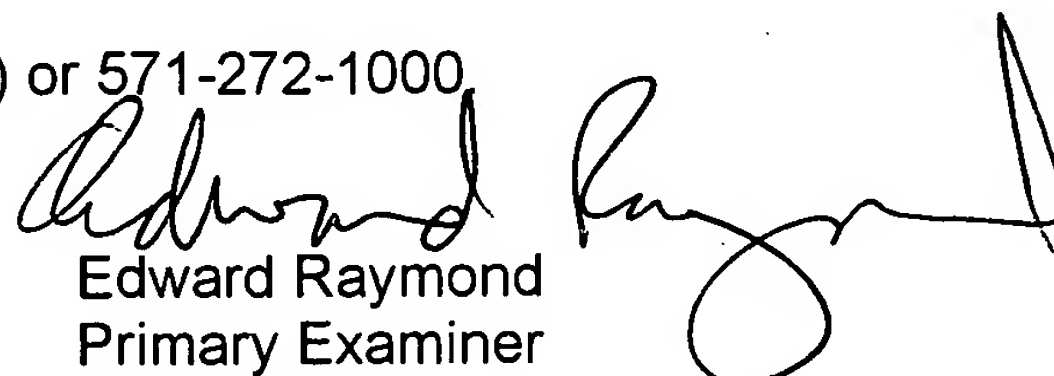
Contact Information

4.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Edward Raymond whose telephone number is 571-272-

2221. The examiner can normally be reached on M-F 8:30-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Marc Hoff can be reached on 571-272-2216. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Edward Raymond
Primary Examiner
Art Unit 2857

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